

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An industrial robot having a joint,
wherein the joint includes a first member and a second member rotatable relative to the first member, wherein the first member includes
a first hole provided in the first member, the first hole being provided with a screw hole at a bottom of the first hole, and
a first positioning member contained in the first hole, the first positioning member being slidable through an inside of the first hole and projectable from the first hole, the first positioning member being provided with a screw on one end thereof, and
~~a first attaching member configured to fix the first positioning member at a bottom of the first hole,~~
wherein the first hole and the first positioning member are arranged such that there is no mechanical backlash between the first hole and the first positioning member,
wherein the screw of the first positioning member is screwed into the screw hole of the first hole such that the first positioning member is attached to the first hole,
wherein the second member includes a contacting portion arranged to contact the first positioning member when the first positioning member is projected from the first hole, and
wherein the first positioning member includes a retainer for a lubricant on a side thereof.

2. (Currently Amended) An industrial robot having a joint,
wherein the joint includes a first member and a second member rotatable relative to the first member, wherein the first member includes
a first hole provided in the first member, the first hole being provided with a screw hole at a bottom of the first hole, and
a first positioning member contained in the first hole, the first positioning member being slidable through an inside of the first hole and projectable from the first hole, the first positioning member being provided with a screw on one end thereof, and
~~a first attaching member configured to fix the first positioning member at a bottom of the first hole,~~

wherein the first hole and the first positioning member are arranged such that there is no mechanical backlash between the first hole and the first positioning member,

wherein the screw of the first positioning member is screwed into the screw hole of the first hole such that the first positioning member is attached to the first hole,

wherein the second member includes a contacting portion arranged to contact the first positioning member when the first positioning member is projected from the first hole, and

wherein the first positioning member includes a first marker on a side thereof, and the first marker specifically indicates a projection length of the first positioning member.

3. (Original) The industrial robot as claimed in claim 2, wherein the first positioning member further includes a retainer for a lubricant on a side thereof.

4. (Original) The industrial robot as claimed in claim 2, wherein the first marker is a ring-shaped groove.

5. (Previously Presented) The industrial robot as claimed in claim 1,
wherein the contacting portion is a projection on a side of the second member, and
wherein the projection is formed at a position where the projection can contact the first positioning member when the first positioning member is projected.

6. (Withdrawn - Currently Amended) The industrial robot as claimed in claim 1,
wherein the contacting portion of the second member comprises:
a second hole formed in the second member;
a second positioning member contained in the second hole, the second positioning member being projectable from the second hole; and
~~a second~~an attaching member configured to fix the second positioning member at a bottom of the second hole,
wherein the second positioning member is configured to contact the first positioning member when both the first projecting member and the second projecting member are projected.

7. (Withdrawn) The industrial robot as claimed in claim 6,

wherein the second positioning member includes a second marker on a side thereof, and the second marker specifically indicates a projection length of the second positioning member.

8. (Withdrawn) The industrial robot as claimed in claim 7, wherein the second marker is a ring-shaped groove.

9. (Previously Presented) The industrial robot as claimed in claim 4, wherein the ring-shaped groove is configured to retain a lubricant.

10. (Withdrawn) The industrial robot as claimed in claim 8, wherein the ring-shaped groove is configured to retain the lubricant.

11. (Previously Presented) The industrial robot as claimed in claim 1, wherein the entire first positioning member is contained in the first hole when the joint performs a regular action, and the first positioning member is projected from the first hole when the joint performs origin adjustment.

12. (Previously Presented) The industrial robot as claimed in claim 1, wherein the first positioning member contacts the contacting portion at a position of a mechanical origin of the joint.

13. (Previously Presented) The industrial robot as claimed in claim 1, further comprising a calculator,

wherein the first positioning member contacts the contacting portion at a position displaced by a given angle from a position of a mechanical origin of the joint, and

wherein the calculator calculates the position of the mechanical origin using the given displacement angle and the contact position of the first positioning member.

14. (Previously Presented) The industrial robot as claimed in claim 1, further comprising a control unit,

wherein the joint further includes a driving motor for relatively rotating the first member and the second member, and

wherein the control unit monitors torque owing to a current of the motor and judges presence or absence of contact of the first positioning member with the contacting portion.

15. (Previously Presented) The industrial robot as claimed in claim 2,
wherein the contacting portion is a projection on a side of the second member, and
wherein the projection is formed at a position where the projection can contact the first positioning member when the first positioning member is projected.

16. (Withdrawn – Currently Amended) The industrial robot as claimed in claim 2,
wherein the contacting portion of the second member comprises:
a second hole formed in the second member;
a second positioning member contained in the second hole, the second positioning member being projectable from the second hole; and
~~a second~~ an attaching member configured to fix the second positioning member at a bottom of the second hole,
wherein the second positioning member is configured to contact the first positioning member when both the first projecting member and the second projecting member are projected.

17. (Withdrawn) The industrial robot as claimed in claim 16,
wherein the second positioning member includes a second marker on a side thereof, and the second marker specifically indicates a projection length of the second positioning member.

18. (Withdrawn) The industrial robot as claimed in claim 17, wherein the second marker is a ring-shaped groove.

19. (Withdrawn) The industrial robot as claimed in claim 18, wherein the ring-shaped groove is configured to retain a lubricant.

20. (Previously Presented) The industrial robot as claimed in claim 2, wherein the entire first positioning member is contained in the first hole when the joint performs a regular action, and the first positioning member is projected from the first hole when the joint performs origin adjustment.

21. (Previously Presented) The industrial robot as claimed in claim 2, wherein the first positioning member contacts the contacting portion at a position of a mechanical origin of the joint.

22. (Previously Presented) The industrial robot as claimed in claim 2, further comprising a calculator,

wherein the first positioning member contacts the contacting portion at a position displaced by a given angle from a position of a mechanical origin of the joint, and

wherein the calculator calculates the position of the mechanical origin using the given displacement angle and the contact position of the first positioning member with the contacting portion.

23. (Withdrawn) The industrial robot as claimed in claim 2, further comprising a control unit,

wherein the joint further includes a driving motor for relatively rotating the first member and the second member, and

wherein the control unit monitors torque owing to a current of the motor and judges presence or absence of contact of the first positioning member with the contacting portion.

24. (Currently Amended) The industrial robot as claimed in claim 1, wherein the first positioning member is mounted within the first hole so as to be movable between a position in which an entirety of the first positioning member is arranged within the first hole, and a position in which the first positioning member projects from the first hole, while remaining ~~fixed-attached~~ at the bottom of the first hole by the ~~first attaching member~~ screw and the screw hole.

25. (Currently Amended) The industrial robot as claimed in claim 2, wherein the first positioning member is mounted within the first hole so as to be movable between a position in which an entirety of the first positioning member is arranged within the first hole, and a position in which the first positioning member projects from the first hole, while remaining ~~fixed~~attached at the bottom of the first hole by the ~~first attaching member~~screw and the screw hole.